

Next Generation CFB Coal Generating Unit

Participant

Colorado Springs Utilities, an enterprise of the City of Colorado Springs

Additional Team Members

Foster Wheeler Power Group, Inc.—technology supplier

Location

Fountain, El Paso County, Colorado (Colorado Springs Utilities' Ray D. Nixon Power Plant)

Technology

Foster Wheeler circulating fluidized-bed (CFB) combustion system and advanced selective non-catalytic reduction (SNCR)

Plant Capacity/Production

150 MW

Coal

Sub-Bituminous Powder River Basin (PRB)

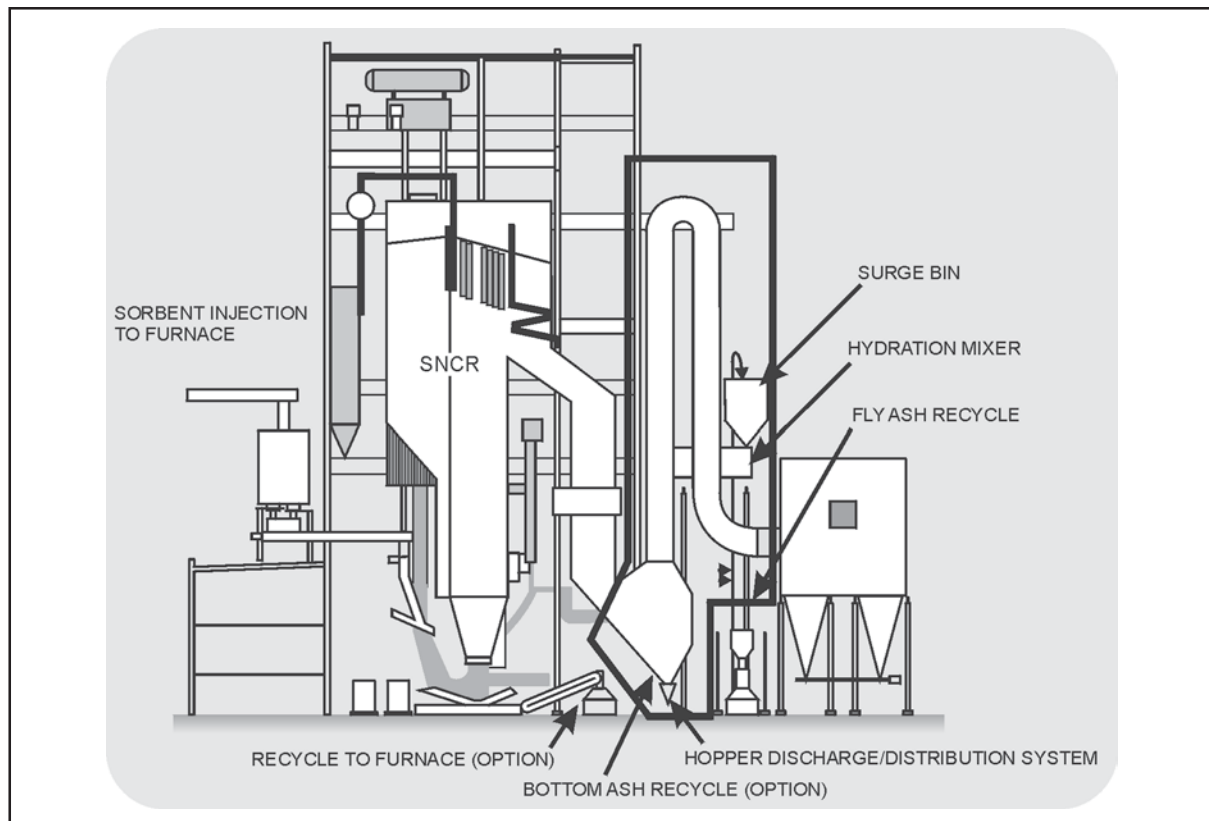
PRB blended with coal waste, biomass, petroleum coke

Project Funding

Total	\$301,504,011	100%
DOE Share	\$ 30,000,000	10
Participant	\$271,504,011	90

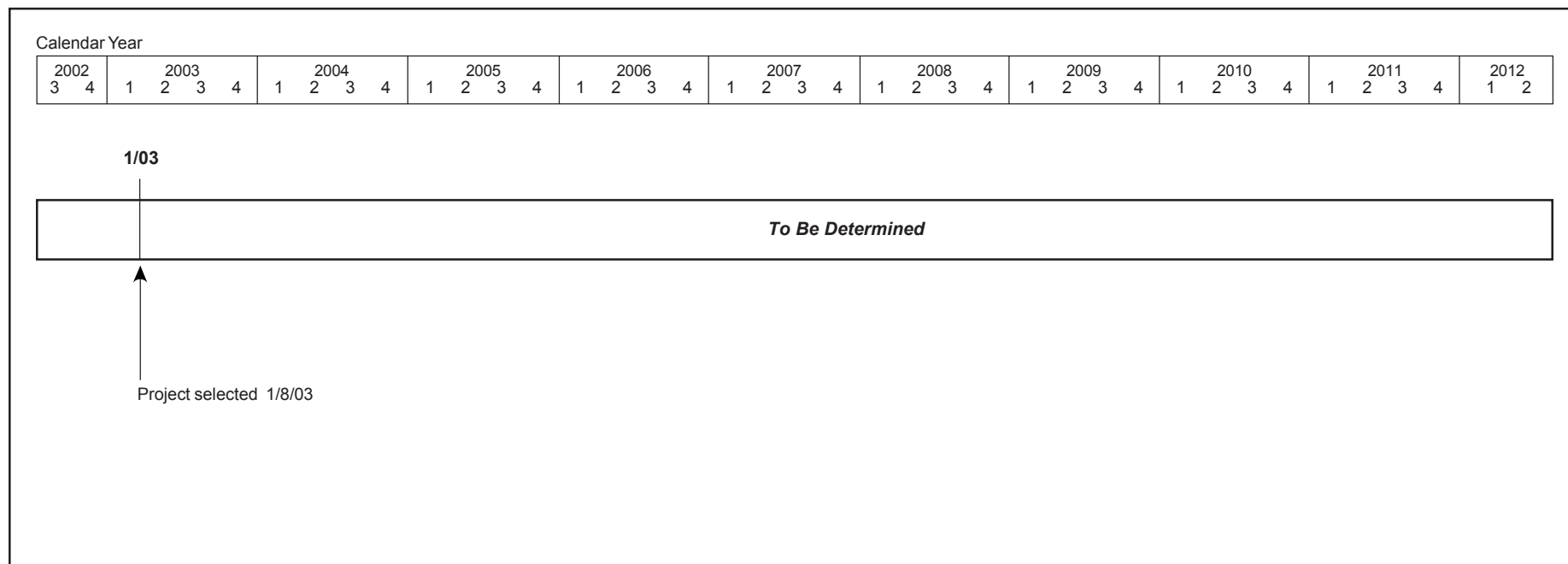
Project Objective

To demonstrate an advanced low-emission CFB combustion system that is expected to achieve 96–98% sulfur removal, while reducing limestone consumption to less than half of conventional CFB systems. The system also features an integrated trace metal control system that can remove up to 90% of mercury, lead, and other metals, as well as virtually all acid gases in the flue gas.



Technology/Project Description

For nitrogen oxides (NO_x), the system features an advanced staged-combustion process coupled with an advanced SNCR system that can reduce stack NO_x levels to those achievable only with higher cost selective catalytic reduction (SCR) technology. For sulfur oxides (SO_x), the design features a three-stage approach to achieve the highest sulfur capture with the lowest limestone consumption. Unlike other processes, the limestone fed to the furnace is the only source of reagent added for sulfur removal. To improve reliability and lower cost, the design features an advanced integrated solids separator system integrated into the traditional furnace structure instead of traditional cyclones.



Project Status/Accomplishments

The project was selected for award on January 8, 2003. Negotiations are underway and the cooperative agreement is expected to be awarded mid- to late-2003. The project is expected to last about six years.

Commercial Applications

This demonstration project offers the opportunity for a low-cost advanced emissions control system applicable to a variety of coals and other fuels for CFBs. The system is predicted to achieve low levels of NO_x (0.04 lb/10⁶ Btu with Powder River Basin coal) using an advanced selective non-catalytic reduction system, very-high sulfur control at 96–98 percent reductions using a three-stage collection system to substantially reduce limestone as compared to more conventional CFBs, and a trace metal emissions control system with potential to remove up to 90 percent of mercury contained in the fuel feed. This demonstration project will also use a suite of fuels including Powder River Basin subbituminous, Illinois and Pittsburgh eastern bituminous, waste coal and biomass/woodwaste while achieving high levels of emissions control. If successful, this unit would become the cleanest

coal-fired electric power plant in the country and could eliminate hazardous forest deadwood biomass (important to local efforts in wildfire management). The plant includes a dry cooling tower to minimize water use (an increasingly important consideration in power plant design). Colorado Springs is one of the fastest growing cities in the region and will benefit by lower power costs from using clean coal technology. The project incorporates an advanced control system (including mercury control) that will be applicable to new and some existing CFB units and will demonstrate fuel flexibility for western and eastern coals as well as waste coals. Co-firing with biomass supports effective carbon management objectives as well.